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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/877,371 | 06/08/2001 | Benjamin Edward Russ | 68581 | 2434 |

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EXAMINER

HARPER, HOLLY R

| | |
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| ART UNIT | PAPER NUMBER |
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2879

DATE MAILED: 08/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------|--------------------------------------|--|
| Office Action Summary | Application No. 09/877,371 | Applicant(s) RUSS ET AL <i>pl</i> | |
| | Examiner Holly R. Harper | Art Unit 2879 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>6</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear what the applicant is claiming. The claim states, “portions of the top surface in between the one or more in-laid linear isolation barriers are adapted to contact a gate structure”. However, Claim 1, states, “one or more in-laid linear isolation barriers formed within the thickness of a top surface”. It is believed the isolation barriers are made from the top surface. Therefore, there is no top surface between the isolation barriers; there is only space, with the emitters in the bottom of the space made. For examination purposes, it is believed that the claim reads, “portions of the top surface of the in-laid linear isolation barriers are adapted to contact a gate structure”.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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4. Claims 1, 2, 6, 8, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuo (USPN 5,340,997).

In regard to claim 1, the Kuo reference discloses a field emission device with a substrate (Figure 1A, Element 102) and an isolation barrier (trench) formed within the top surface of the substrate, which contains an emitter line (Figure 1A, Element 108). The substrate is made of insulating material (Column 5, Line 68- Column 6, Line 2), which provides field isolation between the emitter lines.

In regard to claim 2, the Kuo reference discloses that an electron emitter line is formed within the isolation barrier (Figure 1A, Element 108).

In regard to claim 6, the Kuo reference discloses that the in-laid linear isolation barrier is a trench (Figure 1A, Element 108).

In regard to claim 8, the Kuo reference discloses that the isolation barrier extends the length of the substrate (Figure 1A).

In regard to claim 12, the Kuo reference discloses that each emitter line is a separate and discrete continuous lines extending across the substrate (Figure 1A).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuo (USPN 5,340,997).

In regard to claim 9, the Kuo reference discloses a field emission device with a substrate (Figure 1A, Element 102) and an isolation barrier (trench) formed within the top surface of the substrate, which contains an emitter line (Figure 1A, Element 108). The substrate is made of insulating material (Column 5, Line 68- Column 6, Line 2), which provides field isolation between the emitter lines. While Kuo exemplifies a single emitter, it is within the Kuo teachings the use of a multiple emitters to create a large-scale FED.

7. Claims 1-3 and 6-13 are rejected under 35 U.S.C. 103(a) as being anticipated by Novich (USPN 5,811,926) in view of Kim et al. (USPN 6,146,230).

In regard to claims 1, 8, and 9, the Novich reference discloses a field emission device with a cathode substrate (Figure 2, Element 530 and 542) and an isolation barrier formed within the top surface of the substrate, which contains an emitter tip (Figure 2, Element 556 and 570). The substrate has a conductive layer on top of its substrate, making this the top layer of the substrate (Figure 2, Elements 530 and 542). The conductive layer is made of row conductors (Column 5, Lines 24-30), parts of which are coated with insulative material to make insulating barriers (Column 6, Lines 20-24). The emitters are between the barriers (Figure 2) and are therefore in-laid in the top surface of the substrate. The insulating substrate can be formed of glass or a polymeric material (Column 4, Lines 56-58) and provides field isolation between the emitter lines.

The Novich reference does not disclose the use of an emitter line. The Kim reference teaches that a flat emitter line that runs the length of the substrate can be used in a field emission

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device (Figure 1). Flat emitter lines are cheaper than cone emitters and easier to make uniform on a large scale substrate plate (Column 2, Lines 15-19). The emitter lines would take the place of the emitter tips. Therefore, the in-laid barriers would now surround the emitter lines instead of emitter tips.

Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate flat emitter lines, as taught by Kim, instead of emitter tips.

In regard to claim 2, the Novich reference discloses that an electron emitter line is formed within the isolation barrier (Figure 2, Element 556).

In regard to claim 3, 7, and 10, the Novich reference discloses spacers (gate wires) made of aluminum fibers (Column 9, Lines 48-51) in a frame (Figure 11) positioned over the substrate (Figure 2, Element 616).

Regarding claims 3 and 7, the recitation “dampen vibrations in the gate wires due to the driving frequency” has not been given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 6, the Novich reference discloses that the isolation barriers form a trench (Figure 2).

In regard to claim 11, the Novich reference discloses that a top portion of the isolation barriers are adapted to contact a gate structure extending over the isolation barriers (Figure 2, Element 570 and 616) and (Figure 11).

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In regard to claim 12, the Novich reference in view of Kim discloses that each emitter line is a separate and discrete continuous line extending across the cathode substrate (Kim, Figure 1).

In regard to claim 13, the Novich reference discloses that the in-laid means support the gate structure (Figure 2, Element 570) and the gate structure extends over the linear in-laid means (Figure 11).

8. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuo in view of Chason (USPN 5,019,003).

In regard to claim 1, the Kuo reference discloses a field emission device with a substrate (Figure 1A, Element 102) and an isolation barrier (trench) formed within the top surface of the substrate, which contains an emitter line (Figure 1A, Element 108). The substrate is made of insulating material (Column 5, Line 68- Column 6, Line 2), which provides field isolation between the emitter lines.

In regard to claims 4 and 5, the Kuo reference does not disclose that a trace is used to connect the top surface of the substrate to the emitter line. The Chason reference teaches that a field emission device can have a trace between the substrate and the emitter. This will help control the surface potential. The trace would need to be bent to reach between the substrate and into the trench where the emitter is located.

Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate a trace between the substrate and the emitter, as taught by Chason.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kim et al. (USPN 6,146,230) also discloses the use of isolation barriers to separate emitter lines.

Abashin et al. (USPN 6,590,320 B1) discloses an isolation barrier made from the substrate (Figure 1).

Liu (USPN 5,880,554) discloses a substrate creating the isolation barriers.

Hosogi (USPN 5,245,247) discloses a substrate creating the isolation barriers.

Response to Arguments

10. Applicant's arguments filed 5/12/2003 have been fully considered but they are not persuasive:

Regarding applicants claim that Kuo does not disclose multiple emitter lines, the examiner respectfully disagrees. While Kuo exemplifies a single emitter, it is within the Kuo teachings that multiple emitters are used to create a large-scale FED. Claim 1 states that there are one or more in-laid isolation barriers, and the barriers are adapted to contain emitter lines. The drawings show one emitter line per trench. However, the applicants arguments seem to suggest that there is more than one emitter line per trench.

Regarding applicants claim that Kuo does not disclose how field isolation would occur, the examiner respectfully disagrees. The rejection using Kuo meets all the structural limitations

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of the applicants claims. An in-laid isolation barrier is formed from the top surface of the substrate and they contain electron emitters (Figure 1A).

Regarding applicants claim that Novich does not disclose in-laid isolation barriers, the examiner respectfully disagrees. Novich discloses that the substrate has a conductive layer on top of its substrate, making this the top layer of the substrate. The conductive layer is made of row conductors (Column 5, Lines 24-30), parts of which are coated with insulative material to make insulating barriers (Column 6, Lines 20-24). The emitters are between the barriers (Figure 2) and are therefore in-laid in the top surface of the substrate.

Regarding applicants claim that Novich in view of Kim does not disclose linear in-laid isolating barriers, the examiner respectfully disagrees. Novich discloses isolating barriers around the emitter tips. Kim teaches the use of emitter lines. It would have been obvious to one skilled in the art that the isolating barriers of Novich would now be formed to isolate emitter lines by being linear in-laid isolating barriers.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Holly Harper whose telephone number is (703) 305-7908. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (703) 305-4794. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7382.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Holly Harper
Patent Examiner
Art Unit 2879


**VIP PATEL
PRIMARY EXAMINER**